

IN THE CLAIMS:

Please amend the claims as follows.

A complete listing of all the claims is as follows:

Claims 1 to 86. (Previously Canceled).

Claim 87. (Currently Amended).

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Procedure for the determination of the quality of gas of a probe gas (1), ~~in particular a burnable gas~~, proceeding from a transmission spectrum of the probe gas (1) determined at operating conditions by means of spectroscopical methods of measurement,

~~characterized in that~~ comprising,

- determining at operating conditions out of the transmission spectrum the amounts of substances x_i of the components of the probe gas (1) ~~are determined at operating conditions,~~
- presetting default values for a compressibility factor K and real gas factor Z_n ~~are preset~~ for calculation of the ~~wanted~~ compressibility factor K ,

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- out of quantities at operating conditions of the probe gas (1) as well as from the amounts of substances x_i and substance specific quantities and taking into account of the ~~selected~~ preset default values for compressibility factor K and real gas factor Z_n determining input quantities for the determination of the compressibility factor K ~~are determined~~ ,
- calculating with these input quantities the compressibility factor K ~~is calculated~~ by means of a standard ~~standard-arithmetic procedures~~ , procedure ,
- carrying out an iterative calculation in the way of an iterative recalculation of the input quantities ~~is carried out~~ with the determined value for the compressibility factor K ~~as long~~ , until the value of the compressibility factor K converges and ~~than there~~ then from the volumetric standard calorific value $H_{v,nL}$ and the standard density ρ_n is calculated.

Claim 88. (Currently Amended).

The procedure ~~Procedure~~ according to claim 87, characterized ~~in that wherein~~ as standard-arithmetic procedure the method of iteration AGA8-92DC is used.

Claim 89. (Currently Amended).

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The procedure Procedure according to claim 87, characterized ~~in that~~ wherein as standard-arithmetic procedure the method of iteration GERG88 is used.

Claim 90. (Currently Amended).

The procedure Procedure according to claim 87, characterized ~~in that~~ wherein the amounts of substances x_i of the infrared active components of the probe gas (1) at operating conditions is determined starting from the recorded transmission spectrum by means of multivariate analysis (MVA).

Claim 91. (Currently Amended).

The procedure Procedure according to claim 87, characterized ~~in that~~ wherein the default values of the compressibility factor K ~~and~~ and the real gas factor Z_n are and taken from a characteristic diagram, that describes the influence of the pressure p_b at operating conditions and the temperature T_b at operating conditions for a known composition of a gas similar to the composition of the probe gas (1).

Claim 92. (Currently Amended).

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The procedure ~~Procedure~~ according to claim 87, ~~characterized~~
~~in that wherein~~ directly from the transmission spectrum the
amounts of substances of the infrared active components of the
probe gas (1) at operating conditions and the amount of nitrogen
N₂ of the probe gas (1) are determined as a function of the
amounts of substances of the infrared active components of the
probe gas (1).

Claim 93. (Currently Amended).

The procedure ~~Procedure~~ according to claim 92, ~~characterized~~
~~in that wherein~~ the amount of substance of nitrogen N₂ and the
amounts of substances of the infrared active components
complements each other resulting in the total volume of the probe
gas (1).

Claim 94. (Currently Amended).

Procedure for the determination of the quality of gas of a
probe gas (1), ~~in particular a burnable gas,~~ proceeding from a
transmission spectrum of the probe gas (1) determined at
operating conditions by means of spectroscopical methods of
measurement, ~~characterized in that~~ comprising,

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- presetting default values for compressibility factor K and real gas factor Z_n ~~are preset~~ for calculation of the wanted compressibility factor K ,
 - from the pressure p_b at operating conditions and the temperature T_b at operating conditions of the probe gas (1) with the values for the calorific value $H_{v,b}$ at operating conditions and the density ρ_b at operating conditions, which can be directly determined out of the spectrum, determining input quantities for the determination of the compressibility factor K ~~are determined~~,
 - as further input quantity determining the molar amount of substance of CO_2 ~~is determined~~ by means of a further absorption band of the spectrum,
 - with these input quantities calculating the compressibility factor K ~~is calculated~~ by means of the iterative procedure GERG88,
 - carrying out an iterative calculation in the way of an iterative recalculation of the input quantities ~~is carried out~~ with the determined value for the compressibility factor K ~~as long~~, until the value of the compressibility factor K converges and ~~than there~~

from ~~then from~~ the volumetric standard calorific value $H_{v,n}$ and the standard density ρ_n is calculated.

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Claim 95. (Currently Amended).

The procedure ~~Procedure~~ according to claim 94, characterized ~~in that~~ wherein the calorific value $H_{v,b}$ at operating conditions and the density ρ_b at operating conditions are determined by means of spectral functions for weighting of a value directly from the transmission spectrum of the probe gas ~~(1)~~.

Claim 96. (Currently Amended).

The procedure ~~Procedure~~ according to claim 95, characterized ~~in that~~ wherein with the spectral functions for weighting of a value the weighted influence of the amounts of substances of the components of the probe gas ~~(1)~~ is described for the calorific value $H_{v,b}$ at operating conditions and the density r_b at operating conditions.

Claim 97. (Currently Amended).

The procedure ~~Procedure~~ according to claim 95, characterized ~~in that~~ wherein the default values for compressibility factor K and real gas factor Z_n are taken from a characteristic diagram, that describes the influence of the pressure p_b at operating

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conditions and the temperature T_b at operating conditions for a known composition of a gas similar to the composition of the probe gas (1).

Claim 98. (Currently Amended).

Photometric device for the determination of a transmission spectrum of a probe gas (1), ~~especially for carrying out one of the procedures according to claim 87, showing~~ comprising

a radiation source (2) emitting a measurement radiation (8), in which the measurement radiation (8) passes through a probe cell (3) for capturing a probe gas (1) and enters after passing through a modulation unit (6) for modulating the measurement radiation (8) into at least one radiation receiver (7), which generates electrical measurement signals (9) according to the an incoming intensity of the measurement radiation (8) and transmits these to an electronical unit (10), which determines a said transmission spectrum out of the measurement signals (9), wherein the modulation unit (6) shows a spectral switch unit (46, 47) in the form of a chopper arrangement (28), which transmits because of their selective transmission behaviour only specific spectral regions of the transmission spectrum in the measurement radiation (8) caused by the probe gas (1) to the radiation receiver (7); and

~~characterized in that~~

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wherein the chopper arrangement (28) is provided with an aperture (46) with a spiral opening (31), in which the release of the regions of the wavelength of the measurement radiation (8) is caused continuously for the whole spectrum.

Claim 99. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the chopper arrangement (28) provides such a transmission spectrum ~~behaviour~~, that the transmitted spectral regions are suitable for the further evaluation by procedures of the direct spectral evaluation (DSA).

Claim 100. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the ~~released~~ release of the regions of the wavelength of the measurement radiation (8), which passes through the chopper arrangement (28), can be obtained by means of capturing the rotational position of the aperture (46).

Claim 101. (Currently Amended).

~~Photometric~~ The photometric device according to claim 98, ~~characterized in that~~ wherein the chopper arrangement (28) is provided with two groups of sector elements (36, 37)

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alternatively releasing the measurement radiation (8), in which a first optical waveguide (34) guides the measurement radiation (8) released by the sector elements of the first sector element group (36) into the probe cell (3) and after passing through the probe cell (3) to the radiation receiver (7) and a second optical waveguide (35) guides the measurement radiation (8) released by the sector elements of the second sector element group (37) directly to the radiation receiver (7).

Claim 102. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation (8) released by the sector elements of the first and second sector element groups (36, 37) are concentrated by means of said first optical waveguide (34) and said second optical waveguide (35) into one or more filters (21) or a dispersive element (6), preferably or a monochromator (32).

Claim 103. (Currently Amended).

~~Photometric~~ The photometric device according to claim 102, ~~characterized in that~~ wherein the radiation receiver (7) collects the measurement radiation (8), which is coming out of the one or more filters or the dispersive element and each released through

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the sector elements of the sector element groups (36, 37) of both optical waveguides (34, 35).

Claim 104. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation (8), which is released through the sector elements of the sector element groups (36, 37) of that first optical waveguide (34), which is guided directly to the radiation receiver (7), is usable as reference for eliminating the influence of CO₂, which exists in the surrounding of the probe cell (3) and/or of the photometric device, of changes of the radiation source (2) and/or of the radiation receiver (7).

Claim 105. (Currently Amended).

~~Photometric~~ The photometric device according to claim 101, ~~characterized in that~~ wherein the measurement radiation (8), which is each released through the sector elements of the first and second sector element groups (30, 31), is guided through the first and the second optical waveguide (34, 35) to the input of the one or more filters (21) or ~~the~~ a dispersive element (6), in which at the chopper arrangement (28) also available ~~further~~ sector element groups (36, 37) lock on the measurement radiation (8), which is released of the one or more filters (21) or the

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dispersive element (6), alternatively to the radiation receiver (7).

Claim 106. (Currently Amended).

~~Photometric~~ The photometric device according to claim 102, ~~characterized in that wherein~~ the measurement radiation (8), which is each released through the sector elements (30, 31), is guided together by means of the first and the second optical waveguides ~~waveguide~~ (34, 35) in a Y-fibre coupler (38), which guides the measurement radiation (8) of the first and the second waveguide (34, 35) to the one or more filters (21) or the dispersive element (6).

Claim 107. (Currently Amended).

~~Photometric~~ The photometric device according to claim 105, ~~characterized in that wherein~~ the chopper arrangement (28) carries out both the selection of the wavelengths for the transmission spectrum as well as the alternating reverse of the measured section between the first and second optical waveguides (34, 35).

Claim 108. (Currently Amended).

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Photometric ~~The photometric~~ device according to ~~one of the~~
claims claim 101, ~~characterized in that wherein~~ the probe cell
(3) is sweepable with an infrared inactive gas, preferably
nitrogen N_2 , for carrying out a null measurement for the
compensation of dirt accumulation ~~or the same~~ of the optical
facilities (2, 7, 32) of the photometric device.